

Mathematics Level 2

Chapter 2 — Algebra

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Additive patterns that increase or decrease by a constant amount

recognise, describe and create additive patterns that increase or decrease by a constant amount, using numbers, shapes and objects, and identify missing elements in the pattern — VC2M2A01

Patterns are all around you. Find what stays the same, and you will know what comes next.

Things you need: counters, cubes, sticks, a number line, a hundreds chart, pencils and paper.

What we learn

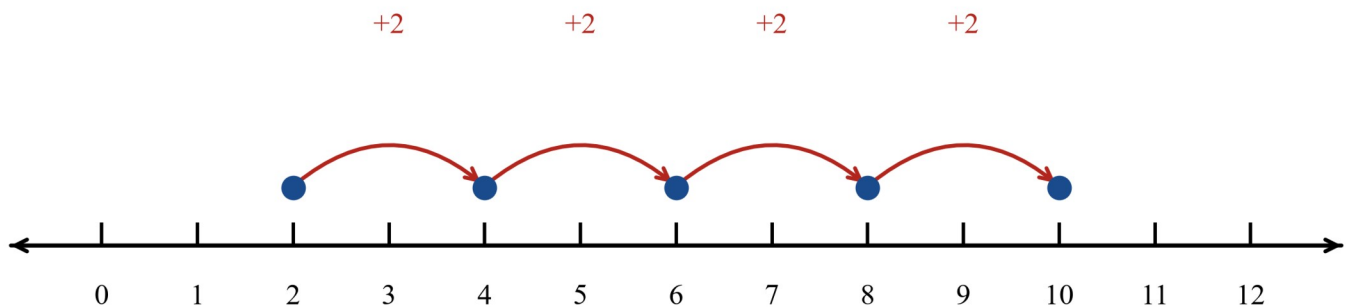
Patterns that grow

Look at this pattern:

2, 4, 6, 8, 10, ...

Each number is 2 more than the one before. The pattern grows by the same amount each time.

We say the rule is: **start at 2 and add 2 each time.**



A number line from 0 to 12 with dots on 2, 4, 6, 8 and 10. Each jump goes up by 2.

The rule

The rule tells you how a pattern works.

For 2, 4, 6, 8, the rule is add 2 each time. You can write number sentences for each step:

$2 + 2 = 4$, then $4 + 2 = 6$, then $6 + 2 = 8$.

When you know the rule, you can keep the pattern going.

Patterns that go down

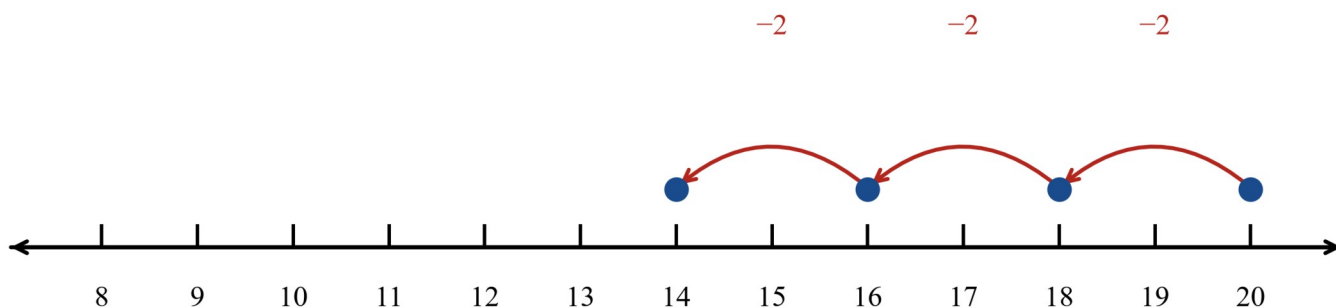
Patterns can go down too. Look at this pattern:

20, 18, 16, 14, ...

Each number is 2 less than the one before.

The rule is: **start at 20 and take away 2 each time.**

Number sentences: $20 - 2 = 18$, then $18 - 2 = 16$, then $16 - 2 = 14$.



A number line from 8 to 20 with dots on 14, 16, 18 and 20. Each jump goes down by 2.

Increase and decrease

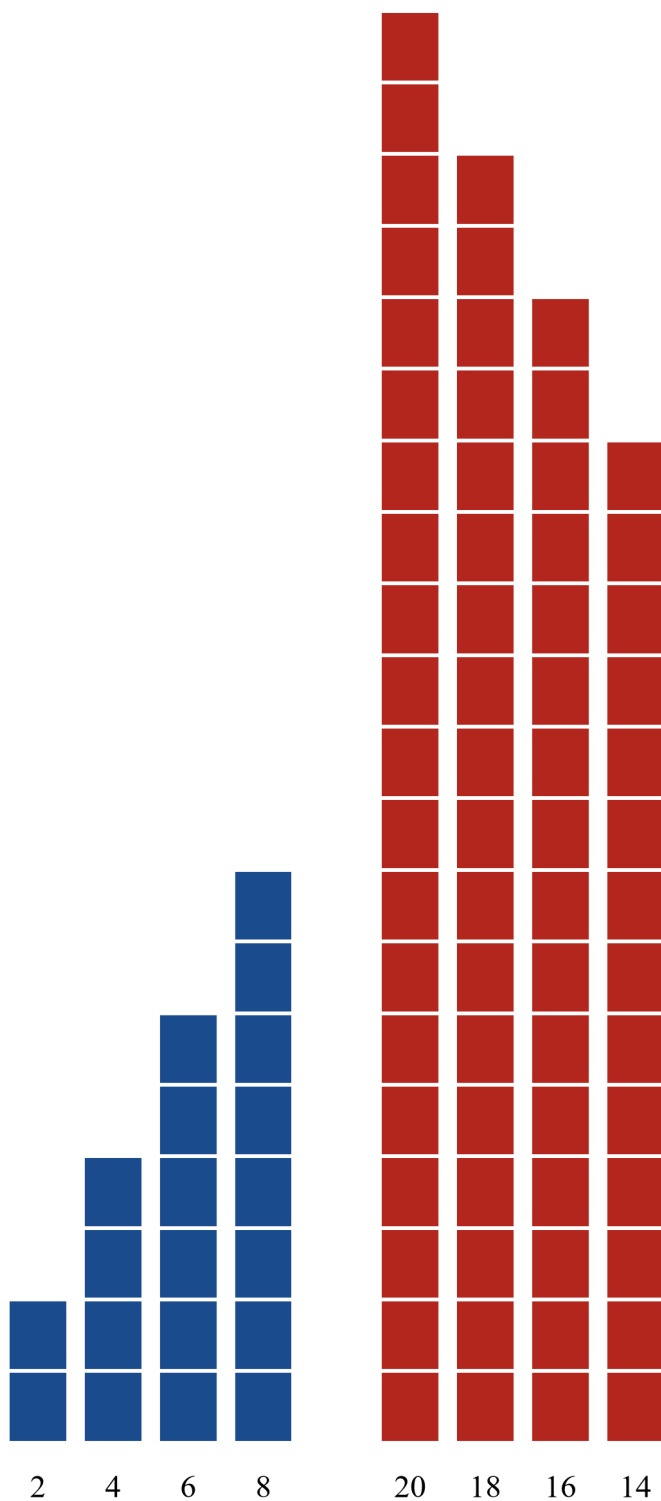
Some patterns **increase**. They go up by the same amount each time.

Some patterns **decrease**. They go down by the same amount each time.

The amount you add or take away stays the same. That same amount is called a **constant amount**.

goes up

goes down

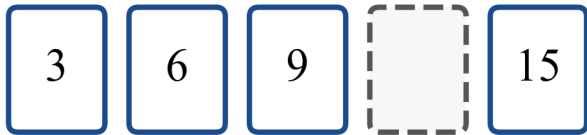


Towers of blocks. The left towers go up: 2, 4, 6, 8. The right towers go down: 20, 18, 16, 14.

Find a missing number

Sometimes a number in a pattern is missing. Look at this:

3, 6, 9, □, 15



Number cards that show 3, 6 and 9, then a missing card, then 15.

First find the rule. From 3 to 6 is add 3. From 6 to 9 is add 3. The rule is add 3 each time.

So $\square$ is $9 + 3 = 12$. Check: $12 + 3 = 15$. ✓

Patterns with shapes and things

You can make patterns with sticks, counters and cubes.

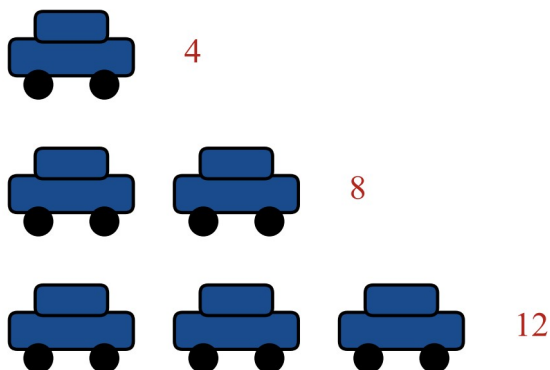
One triangle needs 3 sticks. Two triangles in a row need 5 sticks. Three triangles need 7 sticks.

The numbers are 3, 5, 7. The rule is: start at 3 and add 2 each time.



Triangles made with sticks: 1, 2 and 3 triangles use 3, 5 and 7 sticks.

Patterns hide in things around you too. One car has 4 wheels. Two cars have 8 wheels. Three cars have 12 wheels. The rule is add 4 each time.



Cars with wheels: 1, 2 and 3 cars have 4, 8 and 12 wheels.

Make your own

Make a pattern with cubes or counters. Then tell a friend the rule.

Can your friend make your pattern from your rule?

We try together

Do these with your teacher. Use things to touch, or look at the dots here.

We try 1 — a pattern that grows

Mia makes triangles in a row with sticks. One triangle is 3 sticks. Each new triangle needs 2 more sticks.

Working	Note
Make 1 triangle. Count the sticks: 3.	1 triangle is 3 sticks.
Add 2 more sticks. Count them all: $3 + 2 = 5$.	2 triangles are 5 sticks.
Add 2 more sticks. Count them all: $5 + 2 = 7$.	3 triangles are 7 sticks.
Add 2 more sticks. Count them all: $7 + 2 = 9$.	4 triangles are 9 sticks.
The numbers are 3, 5, 7, 9. The rule is: start at 3, add 2 each time.	Each step is 2 more sticks.

Each ● is 1 stick. The rows show 1, 2, 3 and 4 triangles.

.....



3



5



7



9

Rows of triangles made with sticks, showing 3, 5, 7 and 9 sticks.

$\therefore$ The rule is start at 3 and add 2 each time. 5 triangles need 11 sticks, because $9 + 2 = 11$.

We try 2 — a pattern that goes down

There are 15 children on a bus. At each stop, 3 children get off.

Q5. Patterns with things. One car has 4 wheels.

- a. How many wheels do 2 cars have?
- b. Finish the table.

Cars	1	2	3	4
Wheels	4	8		

- c. What is the rule? Add each time.

Q6. Make a pattern. Use cubes.

- a. Make a pattern that goes up by 3 each time. Start at 1.
- b. Write the first 4 numbers of your pattern.
- c. Tell a friend your rule. Can your friend make your pattern?

On your own

Q7. Write the next 3 numbers.

- a. 10, 20, 30, , ,
- b. 7, 9, 11, , ,
- c. 6, 12, 18, , ,

Q8. Write the next 3 numbers.

- a. 18, 16, 14, , ,
- b. 25, 20, 15, , ,
- c. 30, 27, 24, , ,

Q9. Find the missing number.

- a. 4, 8, 12, , 20
- b. 2, 5, 8, , 14
- c. 16, , 12, 10

Q10. Make a pattern from a rule. Write the first 4 numbers.

- a. Start at 12 and take away 2 each time.
- b. Start at 3 and add 5 each time.
- c. Start at 50 and take away 10 each time.

Q11. Look at this pattern: 6, 9, 12, 15.

- a. What is the rule?
- b. Write the next 2 numbers.
- c. Is 20 in this pattern? How do you know?

Q12. Sticks and squares. One square needs 4 sticks. Each new square needs 3 more sticks. The numbers of sticks are 4, 7, 10.



4



7



10

Squares made with sticks: 1, 2 and 3 squares use 4, 7 and 10 sticks.

- How many sticks do 4 squares need?
- What is the rule? Start at and add each time.
- Write a number sentence for the last step.

Q13. Tom says the pattern 2, 5, 8, 11 goes up by 2 each time. Is Tom right? How do you know?

Q14. Make your own pattern that goes down. Start at 20.

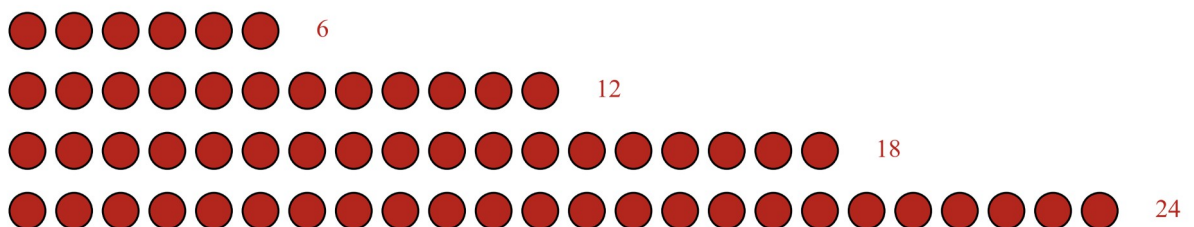
- Write the first 4 numbers of your pattern.
- Write the rule for your pattern.
- A friend follows your rule. What are the next 2 numbers?

Maths in real life

Q15. Football goals

Mia and Tom play Australian football. In this game, one goal is 6 points.

Source: AFL, Laws of the Game, afl.com.au, retrieved 2026-08-19.



Rows of dots showing the points for goals: 6, 12, 18 and 24 points for 1, 2, 3 and 4 goals.

- Write the points pattern for 1 goal, 2 goals, 3 goals and 4 goals.
- What is the rule?
- Their team kicks 5 goals. How many points is that? Write the number sentence.
- At the end of the game, the team has 36 points from goals. How many goals did the team kick? Show how you know.

Answers

Q1. b. 8, 10 c. 10.

Q2. a. 5 b. 25, 30 c. 5, 5.

Q3. a. down b. take away c. 12, 10.

Q4. a. 3 b. 12 c. 12, 12.

Q5. a. 8 b. 12, 16 c. 4.

Q6. a–b. 1, 4, 7, 10 c. Check that your friend's pattern goes up by 3 each time.

Q7. a. 40, 50, 60 b. 13, 15, 17 c. 24, 30, 36.

Q8. a. 12, 10, 8 b. 10, 5, 0 c. 21, 18, 15.

Q9. a. 16 b. 11 c. 14.

Q10. a. 12, 10, 8, 6 b. 3, 8, 13, 18 c. 50, 40, 30, 20.

Q11. a. add 3 each time b. 18, 21 c. no.

Q12. a. 13 b. 4, 3 c. $10 + 3 = 13$.

Q13. No. $2 + 3 = 5$, so the pattern goes up by 3 each time.

Q14. Answers can be different. Check that the numbers go down by the same amount each time.

Q15. a. 6, 12, 18, 24 b. start at 6 and add 6 each time c. 30 points; $24 + 6 = 30$ d. 6 goals.

All the working

Q1. Start at 4 and add 2 each time: $4 + 2 = 6$, $6 + 2 = 8$, $8 + 2 = 10$.

$\therefore$ b. 8, 10 c. $8 + 2 = 10$.

Q2. From 5 to 10 is add 5, and from 10 to 15 is add 5. The rule is add 5 each time. Keep going: $20 + 5 = 25$ and $25 + 5 = 30$.

$\therefore$ a. 5 b. 25, 30 c. start at 5 and add 5 each time.

Q3. From 20 to 18 is take away 2, and from 18 to 16 is take away 2. The pattern goes down. Keep going: $14 - 2 = 12$ and $12 - 2 = 10$.

$\therefore$ a. down b. take away c. 12, 10.

Q4. From 3 to 6 is add 3, and from 6 to 9 is add 3. The missing number is $9 + 3 = 12$. Check: $12 + 3 = 15$. ✓

$\therefore$ a. 3 b. 12 c. $9 + 3 = 12$, and $12 + 3 = 15$.

Q5. Each car has 4 wheels. 1 car is 4, 2 cars are $4 + 4 = 8$, 3 cars are $8 + 4 = 12$, 4 cars are $12 + 4 = 16$. The rule is add 4 each time.

$\therefore$ a. 8 b. 12, 16 c. 4.

Q6. Start at 1 and add 3 each time: $1 + 3 = 4$, $4 + 3 = 7$, $7 + 3 = 10$.

$\therefore$ a–b. 1, 4, 7, 10 c. the friend's pattern must go up by 3 each time.

Q7. a. Add 10 each time: $30 + 10 = 40$, $40 + 10 = 50$, $50 + 10 = 60$. b. Add 2 each time: $11 + 2 = 13$, $13 + 2 = 15$, $15 + 2 = 17$. c. Add 6 each time: $18 + 6 = 24$, $24 + 6 = 30$, $30 + 6 = 36$.

$\therefore$ a. 40, 50, 60 b. 13, 15, 17 c. 24, 30, 36.

Q8. a. Take away 2 each time: $14 - 2 = 12$, $12 - 2 = 10$, $10 - 2 = 8$. b. Take away 5 each time: $15 - 5 = 10$, $10 - 5 = 5$, $5 - 5 = 0$. c. Take away 3 each time: $24 - 3 = 21$, $21 - 3 = 18$, $18 - 3 = 15$.

$\therefore$ a. 12, 10, 8 b. 10, 5, 0 c. 21, 18, 15.

Q9. a. The rule is add 4 each time: $12 + 4 = 16$. Check: $16 + 4 = 20$. ✓ b. The rule is add 3 each time: $8 + 3 = 11$. Check: $11 + 3 = 14$. ✓ c. The rule is take away 2 each time: $16 - 2 = 14$. Check: $14 - 2 = 12$. ✓

$\therefore$ a. 16 b. 11 c. 14.

Q10. a. $12 - 2 = 10$, $10 - 2 = 8$, $8 - 2 = 6$. b. $3 + 5 = 8$, $8 + 5 = 13$, $13 + 5 = 18$. c. $50 - 10 = 40$, $40 - 10 = 30$, $30 - 10 = 20$.

$\therefore$ a. 12, 10, 8, 6 b. 3, 8, 13, 18 c. 50, 40, 30, 20.

Q11. From 6 to 9 is add 3, and from 9 to 12 is add 3. The rule is add 3 each time. Keep going: $15 + 3 = 18$ and $18 + 3 = 21$. The pattern goes 18, 21, so it does not land on 20.

$\therefore$ a. add 3 each time b. 18, 21 c. no; $18 + 3 = 21$, so 20 is not in the pattern.

Q12. Each new square needs 3 more sticks. 4 squares: $10 + 3 = 13$. The rule is start at 4 and add 3 each time.

$\therefore$ a. 13 b. 4, 3 c. $10 + 3 = 13$.

Q13. From 2 to 5 is add 3, and from 5 to 8 is add 3. The pattern goes up by 3 each time, not 2.

$\therefore$ No. $2 + 3 = 5$, so the rule is add 3 each time.

Q14. Answers can be different. One pattern: 20, 18, 16, 14, with the rule start at 20 and take away 2 each time. The next 2 numbers are $14 - 2 = 12$ and $12 - 2 = 10$. Check that the student's own numbers go down by the same amount each time.

Q15. One goal is 6 points. Count by 6: 6, 12, 18, 24, 30, 36. Each goal adds 6 more points. For 5 goals: $24 + 6 = 30$. For 36 points: 6, 12, 18, 24, 30, 36 is 6 steps, so 6 goals.

$\therefore$ a. 6, 12, 18, 24 b. start at 6 and add 6 each time c. 30 points; $24 + 6 = 30$ d. 6 goals.

Repetition in operations: multiplication as repeated addition, division as repeated subtraction

apply repetition in arithmetic operations, including multiplication as repeated addition and division as repeated subtraction — VC2M2A04

Take your time. Say each number sentence out loud as you write it.

Things you need: counters, pencils and paper.

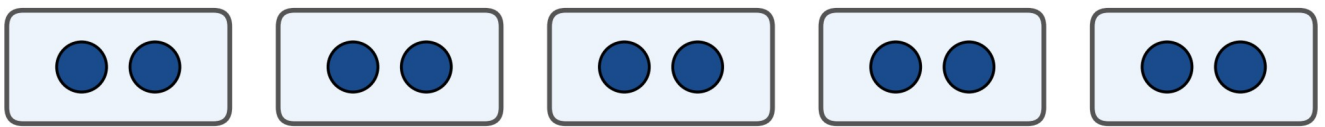
What we learn

The same number, again and again

Look at this:

$$2 + 2 + 2 + 2 + 2 = 10$$

We added 2 five times. It is the same number, again and again.

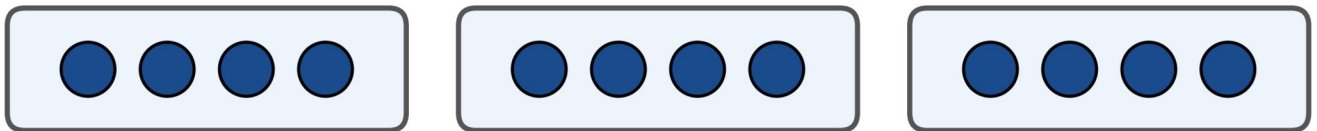


Five groups of two counters. There are ten counters.

Multiplication is repeated addition

Here are 3 groups of 4 counters:

●●●● ●●●● ●●●●



Three groups of four counters. There are twelve counters.

To find how many there are, add 4 three times:

$$4 + 4 + 4 = 12$$

There is a short way to write this:

$$3 \times 4 = 12$$

Multiplication is repeated addition. 3×4 means $4 + 4 + 4$.

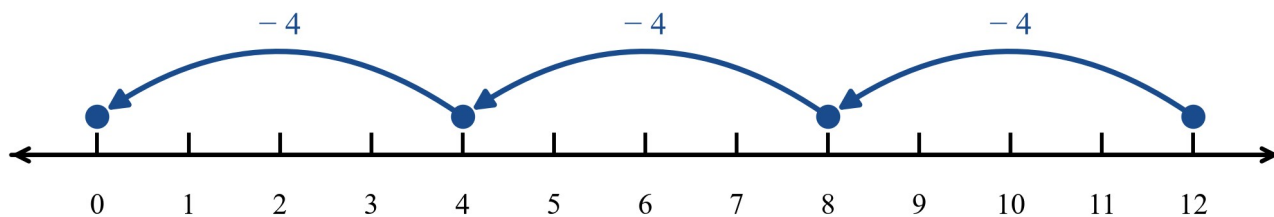
Division is repeated subtraction

Now start with 12 and take away 4 each time:

$$12 - 4 = 8$$

$$8 - 4 = 4$$

$$4 - 4 = 0$$



A number line from 0 to 12. Three jumps of 4 go back: 12 to 8, 8 to 4, 4 to 0.

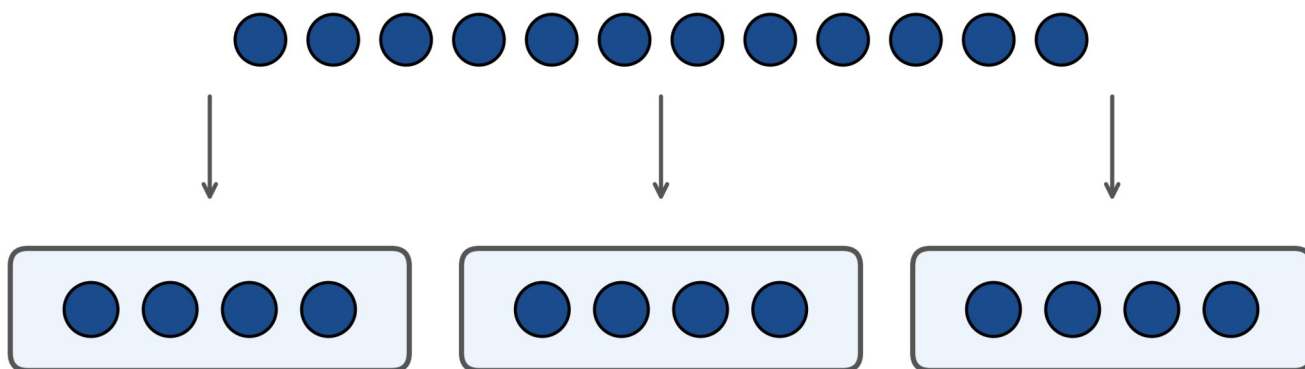
We took away 4 three times to get to 0. The short way is:

$$12 \div 4 = 3$$

Division is repeated subtraction. $12 \div 4$ asks: how many times can I take 4 away from 12?

Sharing equally

12 counters are shared equally into 3 groups.



Twelve counters shared equally into three groups. Each group has four counters.

Give one counter to each group. Do it again. And again. Each time, 3 counters go out.

$$12 - 3 - 3 - 3 - 3 = 0$$

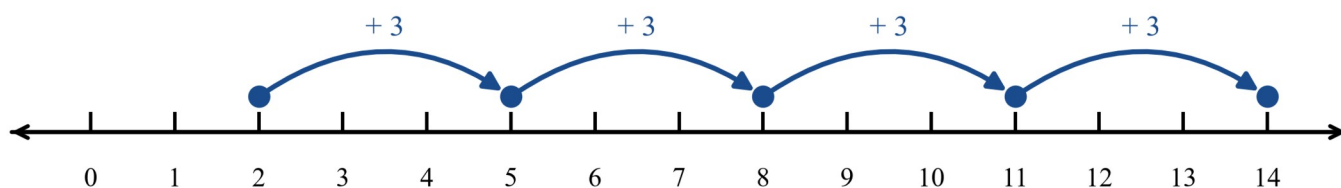
You did this 4 times. Each group gets 4 counters.

$$12 \div 3 = 4$$

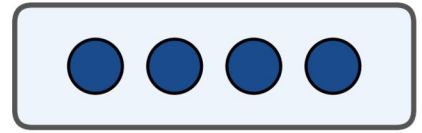
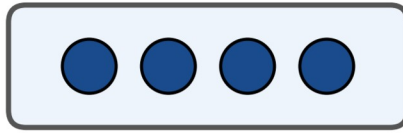
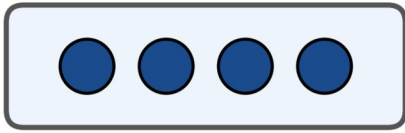
Number lists from a start

Start at 2 and add 3 each time:

2, 5, 8, 11, 14, ...



A number line. Start at 2 and jump on by 3 each time: 2, 5, 8, 11, 14.

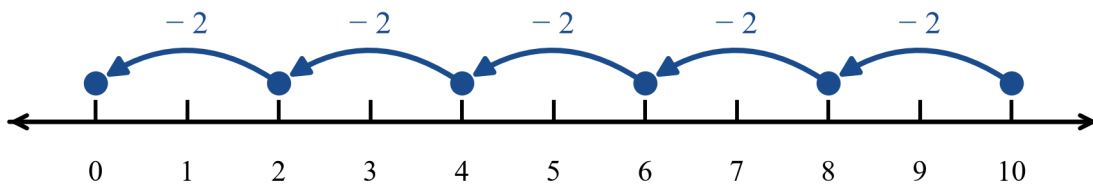


Three groups of four counters. There are twelve counters.

a. $4 + 4 + 4 = \square$

b. $3 \times 4 = \square$

Q2. Division is repeated subtraction. Start at 10 and take away 2 each time.



A number line from 0 to 10. Five jumps of 2 go back from 10 to 0.

$$10 - 2 = 8, 8 - 2 = 6, 6 - 2 = 4, 4 - 2 = 2, 2 - 2 = 0$$

a. How many times did you take away 2? $\square$

b. $10 \div 2 = \square$

Q3. 12 counters are shared equally into 3 groups.



a. Draw lines to sort the counters into 3 equal groups.

b. Each group has $\square$ counters.

c. $12 \div 3 = \square$

Q4. Make a sequence.

a. Start at 2. Add 3 each time.

2, 5, 8, $\square$, $\square$

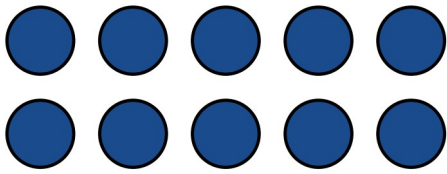
b. Start at 20. Take away 5 each time.

20, 15, 10, $\square$, $\square$

On your own

Q5. Look at the dots. There are 2 rows of 5.





Dots in two rows. There are five dots in each row.

a. Write the repeated addition: $\square + \square = \square$

b. Write the multiplication: $\square \times \square = \square$

Q6. Take away the same number again and again until you get to 0. Then write the division.

a. $15 - 5 - 5 - 5 = 0$. How many times did you take away 5? $\square$

$$15 \div 5 = \square$$

b. $8 - 2 - 2 - 2 - 2 = 0$. How many times did you take away 2? $\square$

$$8 \div 2 = \square$$

Q7. Match. Draw a line from each repeated addition to its multiplication.

Repeated addition	Multiplication
$3 + 3 + 3 + 3 + 3$	3×4
$4 + 4 + 4$	4×2
$2 + 2 + 2 + 2$	5×3

Q8. Make a sequence that goes up. Start at 3. Add 4 each time. Write the next 4 numbers.

3, $\square$, $\square$, $\square$, $\square$

Q9. Make a sequence that goes down. Start at 12. Take away 3 each time. Keep going until you get to 0.

12, $\square$, $\square$, $\square$, $\square$

Answers

Q1. a. 12 b. 12.

Q2. a. 5 b. 5.

Q3. b. 4 c. 4.

Q4. a. 11, 14 b. 5, 0.

Q5. a. $5 + 5 = 10$ b. $2 \times 5 = 10$.

Q6. a. 3, $15 \div 5 = 3$ b. 4, $8 \div 2 = 4$.

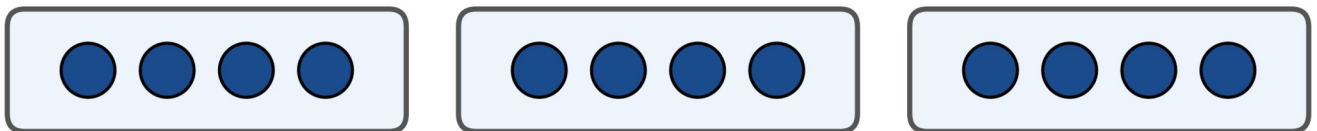
Q7. $3 + 3 + 3 + 3 + 3$ matches 5×3 . $4 + 4 + 4$ matches 3×4 . $2 + 2 + 2 + 2$ matches 4×2 .

Q8. 7, 11, 15, 19.

Q9. 9, 6, 3, 0.

All the working

Q1. $4 + 4 + 4 = 12$. The multiplication uses the same numbers: $3 \times 4 = 12$.



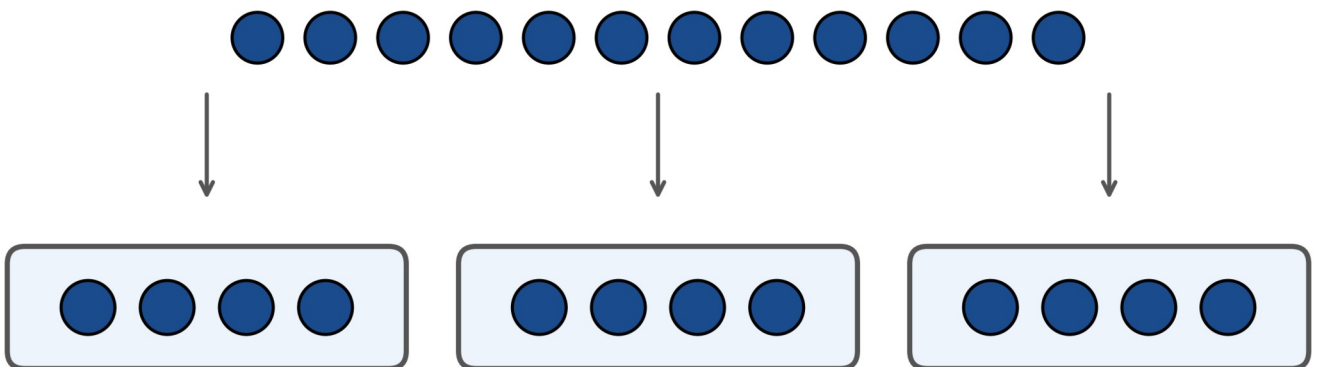
Three groups of four counters. There are twelve counters.

$\therefore$ a. 12 b. 12.

Q2. $10 - 2 = 8$, $8 - 2 = 6$, $6 - 2 = 4$, $4 - 2 = 2$, $2 - 2 = 0$. 2 is taken away 5 times.

$\therefore$ a. 5 b. $10 \div 2 = 5$.

Q3. 12 counters into 3 equal groups: give one to each group, again and again. Each time, 3 counters go out: $12 - 3 - 3 - 3 = 0$. You did this 4 times, so each group gets 4.



Twelve counters shared equally into three groups. Each group has four counters.

$\therefore$ b. 4 c. $12 \div 3 = 4$.

Q4. a. Add 3 each time: $8 + 3 = 11$, $11 + 3 = 14$. b. Take away 5 each time: $10 - 5 = 5$, $5 - 5 = 0$.

$\therefore$ a. 11, 14 b. 5, 0.

Q5. 2 rows of 5 dots: $5 + 5 = 10$, so $2 \times 5 = 10$.

$\therefore$ a. $5 + 5 = 10$ b. $2 \times 5 = 10$.

Q6. a. $15 - 5 - 5 - 5 = 0$. 5 is taken away 3 times, so $15 \div 5 = 3$. b. $8 - 2 - 2 - 2 - 2 = 0$. 2 is taken away 4 times, so $8 \div 2 = 4$.

$\therefore$ a. 3, $15 \div 5 = 3$ b. 4, $8 \div 2 = 4$.

Q7. $3 + 3 + 3 + 3 + 3$ is 5 threes, so it matches 5×3 . $4 + 4 + 4$ is 3 fours, so it matches 3×4 . $2 + 2 + 2 + 2$ is 4 twos, so it matches 4×2 .

Q8. Start at 3 and add 4 each time: $3 + 4 = 7$, $7 + 4 = 11$, $11 + 4 = 15$, $15 + 4 = 19$.

$\therefore$ 3, 7, 11, 15, 19.

Q9. Start at 12 and take away 3 each time: $12 - 3 = 9$, $9 - 3 = 6$, $6 - 3 = 3$, $3 - 3 = 0$.

$\therefore$ 12, 9, 6, 3, 0.

Addition facts to 20 and the related subtraction facts

recall and demonstrate proficiency with addition facts to 20; extend and apply facts to develop related subtraction facts — VC2M2A02

Take your time. There is no timer. Do a little each day, and soon you will just know the facts to 20.

Things you need: counters, cubes, a 10-frame, a number line, a dice, 2 cups, pencils and paper.

What we learn

Addition facts to 20

An addition fact is a sum like $8 + 7 = 15$. The answer is 20 or less.

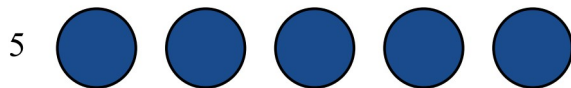
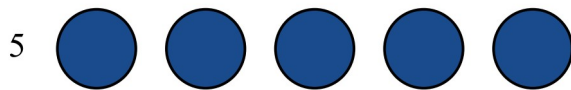
This year, we learn to just know these facts, with no counting. A little each day is the best way.

Doubles

A double is a number added to itself:

$1 + 1 = 2$, $2 + 2 = 4$, $3 + 3 = 6$, $4 + 4 = 8$, $5 + 5 = 10$

$6 + 6 = 12$, $7 + 7 = 14$, $8 + 8 = 16$, $9 + 9 = 18$, $10 + 10 = 20$



$$5 + 5 = 10$$

Two rows of counters. Each row has five counters.

Doubles are easy to just know. They help you with other facts.

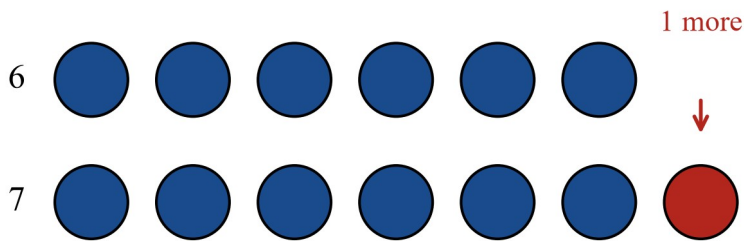
Near doubles

A near double is close to a double.

$6 + 7$ is close to $6 + 6$. Double 6 is 12, so $6 + 7$ is 1 more. $6 + 7 = 13$.

$8 + 7$ is close to $8 + 8$. Double 8 is 16, so $8 + 7$ is 1 less. $8 + 7 = 15$.

Use a double you know. Then add 1, or take 1.



Two rows of counters. The first row has six counters. The second row has seven counters, one more.

Count on

Counting on is good when one number is small.

To find $8 + 3$, start at 8 and count on 3: 9, 10, 11. So $8 + 3 = 11$.

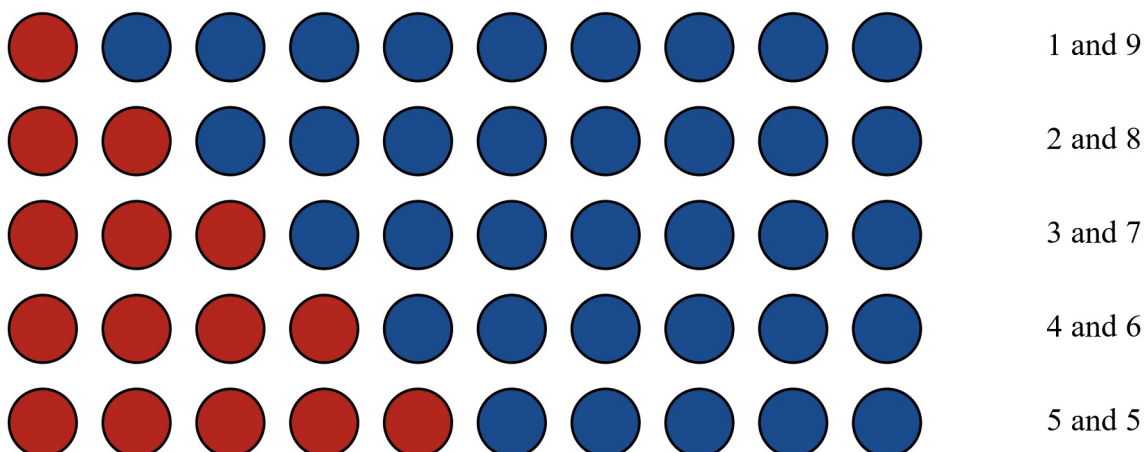


A number line from 0 to 12, with a dot on 8 and three jumps to 9, 10 and 11.

Pairs to 10

These pairs make 10:

$1 + 9$, $2 + 8$, $3 + 7$, $4 + 6$, $5 + 5$



Five rows of ten counters. The red and blue counters show five pairs to ten.

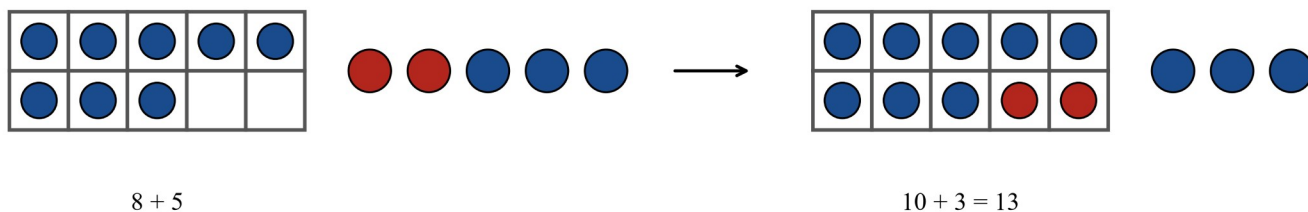
Know your pairs to 10. They help you add big numbers.

Make 10 first

You can use pairs to 10 to add big numbers.

To find $8 + 5$: the 8 needs 2 to make 10. Split the 5 into 2 and 3. Now you have 10 and 3. $10 + 3 = 13$. So $8 + 5 = 13$.

A 10-frame helps you see it.



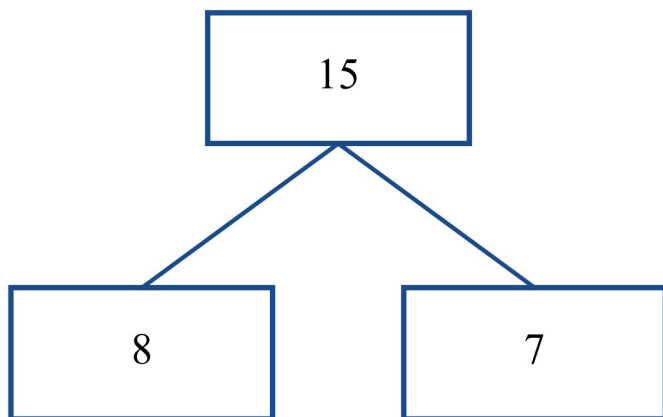
Two pictures of ten boxes. In the first, eight counters sit in the boxes and five more sit next to them. In the second, ten counters fill the boxes and three sit next to them.

Facts go together

Addition and subtraction facts use the same numbers.

The parts are 8 and 7. The whole is 15.

$8 + 7 = 15$, so $15 - 7 = 8$ and $15 - 8 = 7$



Three boxes. The top box is 15. The two boxes under it are 8 and 7.

If you know the addition fact, you know the subtraction facts too. One fact gives you more facts.

All the ways

You can find all the ways to make a number by going in order:

$10 = 10 + 0$, $10 = 9 + 1$, $10 = 8 + 2$, $10 = 7 + 3$, $10 = 6 + 4$, $10 = 5 + 5$, $10 = 4 + 6$, $10 = 3 + 7$, $10 = 2 + 8$, $10 = 1 + 9$, $10 = 0 + 10$

Each time, one part goes down by 1 and the other part goes up by 1. Going in order helps you know you have them all.

We try together

Do these with your teacher. Use things to touch, or look at the dots here.

We try 1 — make 10 first

Find $9 + 6$. Use a 10-frame and counters. Then write the subtraction facts that go with it.

Working

Put 9 counters on the 10-frame.

6 is 1 and 5. Move 1 counter to the 10-frame.

5 counters are left. 10 and 5 is 15.

The parts are 9 and 6. The whole is 15. Turn the fact around.

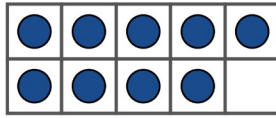
Note

1 spot is empty.

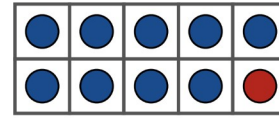
$9 + 1 = 10$. The 10-frame is full.

So $9 + 6 = 15$.

$15 - 6 = 9$ and $15 - 9 = 6$.



$$9 + 6$$



$$10 + 5 = 15$$



Two pictures of ten boxes. The first has nine counters and one empty spot. The second is full, and five counters sit next to it.

Start: ●●●●●●●○ and ●●●●●●●●

Make 10: ●●●●●●●● and ●●●●● left

$\therefore 9 + 6 = 15$, and $15 - 6 = 9$ and $15 - 9 = 6$.

We try 2 — use a double

Find $7 + 6$. Use cubes. Then write the subtraction facts.

Working

Make double 6 with cubes: 6 and 6.

7 is 1 more than 6. Add 1 more cube.

So $7 + 6 = 13$.

The parts are 7 and 6. The whole is 13. Turn the fact around.

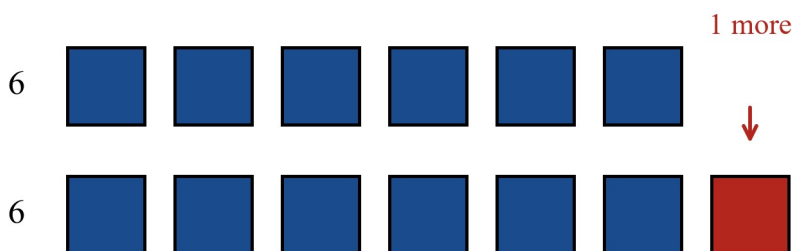
Note

$6 + 6 = 12$.

$12 + 1 = 13$.

This is a near double.

$13 - 7 = 6$ and $13 - 6 = 7$.



$$6 + 6 \text{ and } 1 \text{ more is } 13$$

Two rows of six cubes, and one more cube.

Double 6: ●●●●●● and ●●●●●● $\rightarrow 12$

$7 + 6$: ●●●●●●● and ●●●●●● $\rightarrow 13$

$\therefore 7 + 6 = 13$, and $13 - 7 = 6$ and $13 - 6 = 7$.

Questions to practise

With help

Q1. Make 10. Fill in the missing numbers.



- a. $6 + \square = 10$
- b. $3 + \square = 10$
- c. $\square + 5 = 10$
- d. $9 + \square = 10$
- e. $\square + 8 = 10$
- f. $7 + \square = 10$

Q2. Doubles.

- a. $2 + 2 = \square$
- b. $5 + 5 = \square$
- c. $6 + 6 = \square$
- d. $8 + 8 = \square$
- e. $9 + 9 = \square$
- f. $10 + 10 = \square$

Q3. Near doubles. Use a double you know.

- a. $4 + 5 = \square$ (think double 4)
- b. $6 + 7 = \square$ (think double 6)
- c. $5 + 6 = \square$ (think double 5)
- d. $8 + 7 = \square$ (think double 8)

Q4. Make 10 first.

- a. $8 + 5 = \square$ — first make 10: $8 + \square = 10$, then $10 + \square = \square$
- b. $9 + 7 = \square$ — first make 10: $9 + \square = 10$, then $10 + \square = \square$
- c. $7 + 4 = \square$ — first make 10: $7 + \square = 10$, then $10 + \square = \square$

Q5. Count on. Start at the big number.

- a. $7 + 3 = \square$
- b. $11 + 5 = \square$
- c. $9 + 4 = \square$
- d. $14 + 6 = \square$

Q6. The facts go together. Fill in the missing numbers.

- a. $8 + 7 = 15$, so $15 - 7 = \square$ and $15 - 8 = \square$
- b. $9 + 5 = 14$, so $14 - 5 = \square$ and $14 - 9 = \square$
- c. $6 + 6 = 12$, so $12 - 6 = \square$

On your own

Q7. Add. Try to just know them.

- a. $6 + 8 = \square$
- b. $7 + 9 = \square$
- c. $4 + 7 = \square$
- d. $9 + 6 = \square$
- e. $5 + 8 = \square$
- f. $8 + 8 = \square$
- g. $3 + 9 = \square$
- h. $7 + 6 = \square$

Q8. Take away. Try to just know them.

- a. $13 - 5 = \square$

- b. $16 - 9 = \square$
- c. $12 - 4 = \square$
- d. $15 - 6 = \square$
- e. $18 - 9 = \square$
- f. $14 - 8 = \square$
- g. $11 - 3 = \square$
- h. $20 - 10 = \square$

Q9. Write the 2 subtraction facts that go with each addition fact.

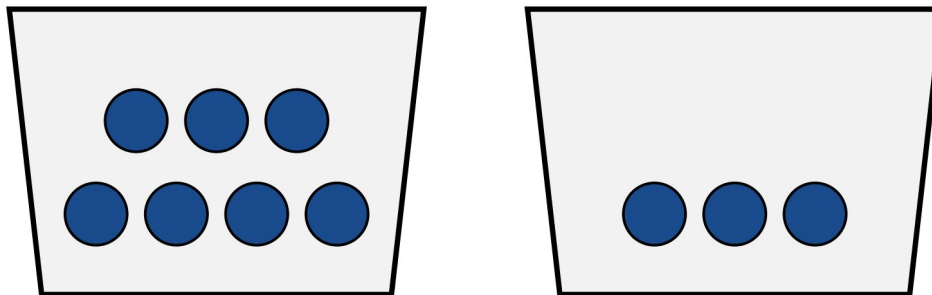
- a. $7 + 6 = 13$
- b. $9 + 8 = 17$
- c. $5 + 9 = 14$

Q10. Find the missing number.

- a. $8 + \square = 15$
- b. $9 + \square = 17$
- c. $\square + 6 = 14$
- d. $16 - \square = 9$
- e. $\square - 5 = 8$
- f. $15 - \square = 6$

Q11. All the ways.

There are 10 counters and 2 cups. All the counters are in the cups. Some are in one cup, and the rest are in the other cup.



Two cups. Seven counters are in one cup, and three are in the other cup.

- a. Find all the ways the 10 counters can be in the 2 cups. Write them like this: $10 = 10 + 0, \dots$
- b. How do you know you have found all the ways?

Q12. Do these. Then write which helper you used: a double, a near double, make 10, or count on.

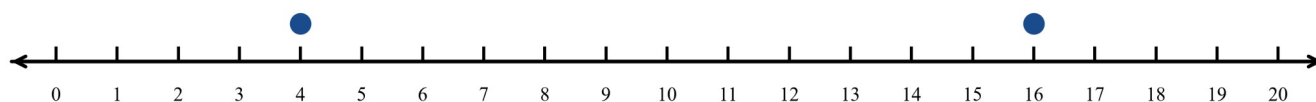
- a. $7 + 7 = \square$
- b. $7 + 8 = \square$
- c. $9 + 6 = \square$
- d. $13 + 4 = \square$

Q13. Read and solve. Write the number sentence.

- a. There are 14 ducks on the pond. 6 ducks swim away. How many ducks are left?
- b. 9 ducks are on the grass. 8 ducks are in the water. How many ducks is that altogether?

Q14. Play “How many more to 20?” with a partner.

Things you need: a dice, paper, a pencil, a number line.



A number line from 0 to 20, with dots on 4 and 16.

How to play:

1. Player 1 rolls the dice. Look at the number on top.
2. Say how many more makes 20. For example, if you roll 4, say 16, because $4 + 16 = 20$.
3. Write the number sentence: $4 + 16 = 20$.
4. Player 2 checks on the number line. If it is right, score 1 point.
5. Take turns. The first player to get 5 points wins.

Maths in real life

Q15. The Penguin Parade

Little penguins live on Phillip Island in Victoria. In the evening, they come up the beach together. Many people go to watch them.

Source: Phillip Island Nature Parks, Penguin Parade, penguins.org.au, retrieved 2026-08-19.

- a. Ella counts 8 penguins on the sand. Then 7 more penguins come up the beach. How many penguins is that altogether? Write the number sentence.
- b. There are 16 penguins on the beach. 9 of them walk to the sea. How many penguins are left on the beach? Write the number sentence.
- c. Ella can see 6 penguins on the rocks and 9 penguins in the waves. How many penguins can she see altogether? Write the 2 subtraction facts that go with your answer.

Answers

Q1. a. 4 b. 7 c. 5 d. 1 e. 2 f. 3.

Q2. a. 4 b. 10 c. 12 d. 16 e. 18 f. 20.

Q3. a. 9 b. 13 c. 11 d. 15.

Q4. a. 13; 2, 3, 13 b. 16; 1, 6, 16 c. 11; 3, 1, 11.

Q5. a. 10 b. 16 c. 13 d. 20.

Q6. a. 8, 7 b. 9, 5 c. 6.

Q7. a. 14 b. 16 c. 11 d. 15 e. 13 f. 16 g. 12 h. 13.

Q8. a. 8 b. 7 c. 8 d. 9 e. 9 f. 6 g. 8 h. 10.

Q9. a. $13 - 7 = 6$ and $13 - 6 = 7$ b. $17 - 9 = 8$ and $17 - 8 = 9$ c. $14 - 5 = 9$ and $14 - 9 = 5$.

Q10. a. 7 b. 8 c. 8 d. 7 e. 13 f. 9.

Q11. a. 11 ways: $10 + 0$, $9 + 1$, $8 + 2$, $7 + 3$, $6 + 4$, $5 + 5$, $4 + 6$, $3 + 7$, $2 + 8$, $1 + 9$, $0 + 10$. Students who count $9 + 1$ and $1 + 9$ as the same way may give 6 ways. Accept this if the list is complete and the rule is clear. b. Any clear check, such as going in order from $10 + 0$ to $0 + 10$ so no way is missed.

Q12. a. 14, a double b. 15, a near double c. 15, make 10 d. 17, count on.

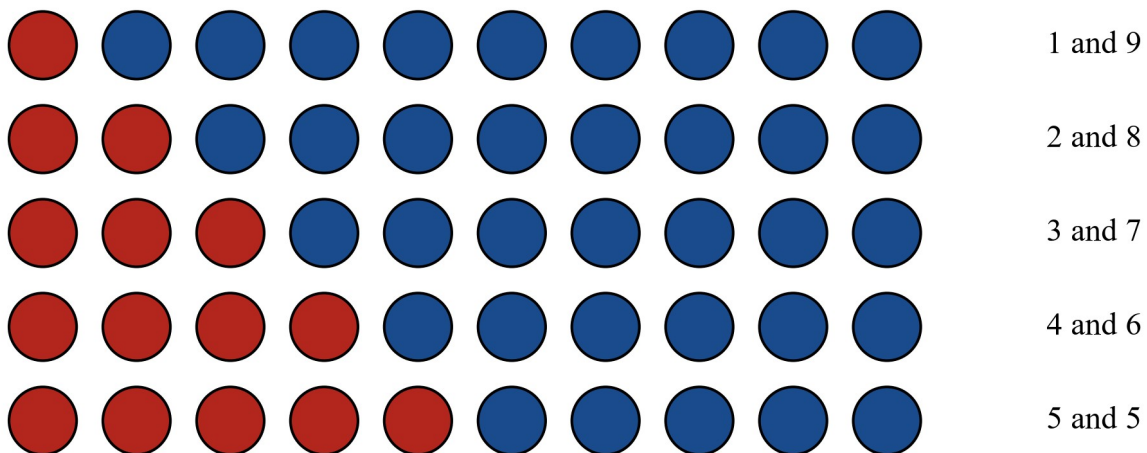
Q13. a. 8 ducks; $14 - 6 = 8$. b. 17 ducks; $9 + 8 = 17$.

Q14. Game. Check each turn: the number rolled and the number said make 20 together.

Q15. a. 15 penguins; $8 + 7 = 15$. b. 7 penguins; $16 - 9 = 7$. c. 15 penguins; $6 + 9 = 15$, and the subtraction facts are $15 - 6 = 9$ and $15 - 9 = 6$.

All the working

Q1. The pairs to 10: $6 + 4 = 10$, $3 + 7 = 10$, $5 + 5 = 10$, $9 + 1 = 10$, $2 + 8 = 10$, $7 + 3 = 10$.



Five rows of ten counters. The red and blue counters show five pairs to ten.

$\therefore$ a. 4 b. 7 c. 5 d. 1 e. 2 f. 3.

Q2. The doubles: $2 + 2 = 4$, $5 + 5 = 10$, $6 + 6 = 12$, $8 + 8 = 16$, $9 + 9 = 18$, $10 + 10 = 20$.

$\therefore$ a. 4 b. 10 c. 12 d. 16 e. 18 f. 20.

Q3. a. Double 4 is 8, and 1 more is 9. b. Double 6 is 12, and 1 more is 13. c. Double 5 is 10, and 1 more is 11. d. Double 8 is 16, and 1 less is 15.

∴ a. 9 b. 13 c. 11 d. 15.

Q4. a. The 8 needs 2 to make 10. 5 is 2 and 3. $10 + 3 = 13$. b. The 9 needs 1 to make 10. 7 is 1 and 6. $10 + 6 = 16$. c. The 7 needs 3 to make 10. 4 is 3 and 1. $10 + 1 = 11$.

∴ a. 13 b. 16 c. 11.

Q5. a. Start at 7, count on 3: 8, 9, 10. b. Start at 11, count on 5: 12, 13, 14, 15, 16. c. Start at 9, count on 4: 10, 11, 12, 13. d. Start at 14, count on 6: 15, 16, 17, 18, 19, 20.

∴ a. 10 b. 16 c. 13 d. 20.

Q6. a. $8 + 7 = 15$, so $15 - 7 = 8$ and $15 - 8 = 7$. b. $9 + 5 = 14$, so $14 - 5 = 9$ and $14 - 9 = 5$. c. $6 + 6 = 12$, so $12 - 6 = 6$. A double gives only one subtraction fact.

∴ a. 8, 7 b. 9, 5 c. 6.

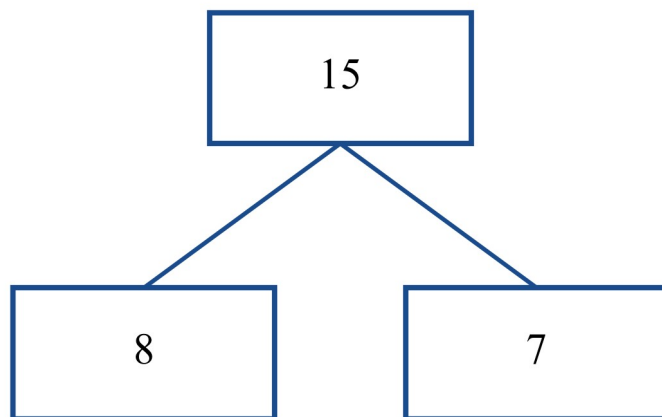
Q7. The addition facts: $6 + 8 = 14$, $7 + 9 = 16$, $4 + 7 = 11$, $9 + 6 = 15$, $5 + 8 = 13$, $8 + 8 = 16$, $3 + 9 = 12$, $7 + 6 = 13$.

∴ a. 14 b. 16 c. 11 d. 15 e. 13 f. 16 g. 12 h. 13.

Q8. The subtraction facts: $13 - 5 = 8$, $16 - 9 = 7$, $12 - 4 = 8$, $15 - 6 = 9$, $18 - 9 = 9$, $14 - 8 = 6$, $11 - 3 = 8$, $20 - 10 = 10$.

∴ a. 8 b. 7 c. 8 d. 9 e. 9 f. 6 g. 8 h. 10.

Q9. The parts and the whole give 2 subtraction facts. a. The parts are 7 and 6, the whole is 13: $13 - 7 = 6$ and $13 - 6 = 7$. b. The parts are 9 and 8, the whole is 17: $17 - 9 = 8$ and $17 - 8 = 9$. c. The parts are 5 and 9, the whole is 14: $14 - 5 = 9$ and $14 - 9 = 5$.



Three boxes. The top box is 15. The two boxes under it are 8 and 7.

∴ a. $13 - 7 = 6$ and $13 - 6 = 7$ b. $17 - 9 = 8$ and $17 - 8 = 9$ c. $14 - 5 = 9$ and $14 - 9 = 5$.

Q10. a. $8 + 7 = 15$. b. $9 + 8 = 17$. c. $8 + 6 = 14$. d. $16 - 7 = 9$. e. $13 - 5 = 8$. f. $15 - 9 = 6$.

∴ a. 7 b. 8 c. 8 d. 7 e. 13 f. 9.

Q11. a. Start with all 10 counters in one cup. Move 1 counter at a time to the other cup, and write each way in order: $10 = 10 + 0$, $10 = 9 + 1$, $10 = 8 + 2$, $10 = 7 + 3$, $10 = 6 + 4$, $10 = 5 + 5$, $10 = 4 + 6$, $10 = 3 + 7$, $10 = 2 + 8$, $10 = 1 + 9$, $10 = 0 + 10$. That is 11 ways. Students who count $9 + 1$ and $1 + 9$ as the same way may give 6 ways; accept this if the

list is complete and the rule is clear. b. One answer: I went in order. The first part goes down by 1 each time — 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 — and the other part goes up by 1 each time. So no way is missed.

Q12. a. $7 + 7 = 14$. Helper: a double. b. $7 + 8 = 15$. Helper: a near double (double 7 is 14, and 1 more is 15). c. $9 + 6 = 15$. Helper: make 10 ($9 + 1 = 10$, and $10 + 5 = 15$). d. $13 + 4 = 17$. Helper: count on (13, 14, 15, 16, 17).

∴ a. 14 b. 15 c. 15 d. 17.

Q13. a. 14 ducks, and 6 swim away: $14 - 6 = 8$. b. 9 ducks on the grass and 8 ducks in the water: $9 + 8 = 17$.

∴ a. 8 ducks b. 17 ducks.

Q14. This is a game. On each turn, the number rolled and the number said make 20 together. Check each number sentence, such as $4 + 16 = 20$, on the number line.

Q15. a. 8 penguins, then 7 more: $8 + 7 = 15$. b. 16 penguins, and 9 walk to the sea: $16 - 9 = 7$. c. 6 on the rocks and 9 in the waves: $6 + 9 = 15$. The subtraction facts use the same numbers: $15 - 6 = 9$ and $15 - 9 = 6$.

∴ a. 15 penguins b. 7 penguins c. 15 penguins; $15 - 6 = 9$ and $15 - 9 = 6$.

Multiplication facts for twos, and the related division facts by doubling and halving

recall and demonstrate proficiency with multiplication facts for twos; extend and apply facts to develop the related division facts using doubling and halving — VC2M2A03

Take your time. There is no rush. Do a little each day, and soon you will just know the 2 facts.

Things you need: counters, cubes, a 10-frame, a hundreds chart, a dice, pencils and paper.

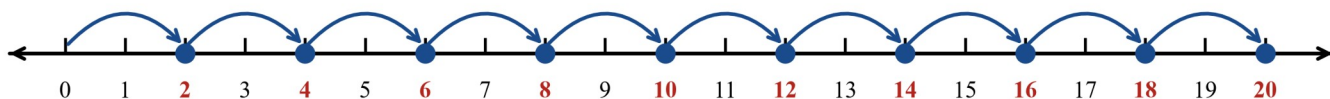
What we learn

Count by 2

We can count by 2:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Each number is 2 more than the one before. This is skip counting.

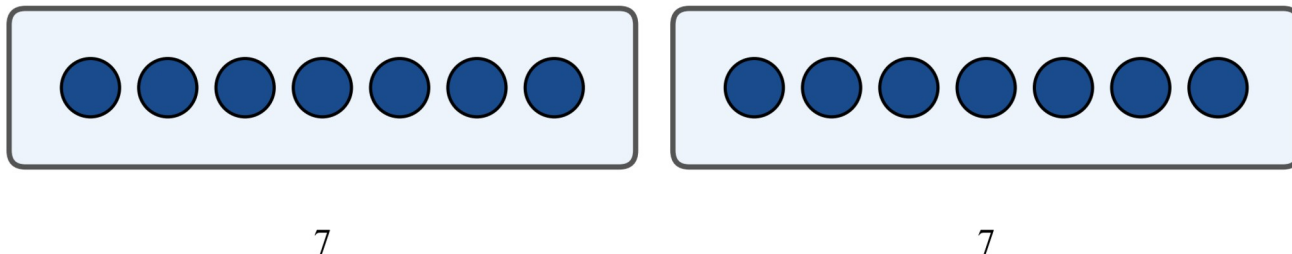


A number line from 0 to 20. The jumps go by 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.

Groups of 2

2 groups of 7 is $7 + 7$. That is 14. We write the number sentence:

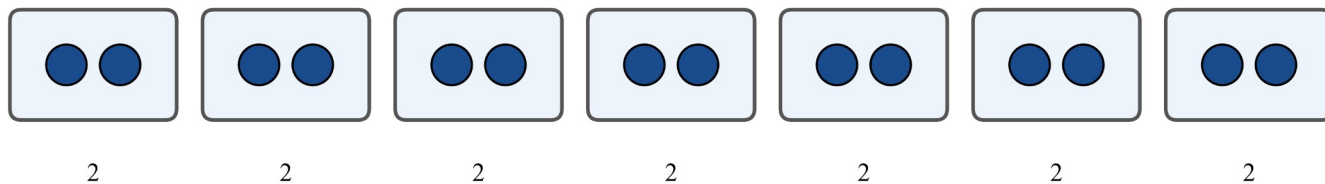
$$2 \times 7 = 14$$



Two groups of 7 counters, 14 counters altogether.

7 groups of 2 is also 14:

$$7 \times 2 = 14$$



Seven groups of 2 counters, 14 counters altogether.

The groups turn around, but the total stays the same. For 8 twos, think 2 eights: $8 \times 2 = 16$ and $2 \times 8 = 16$.

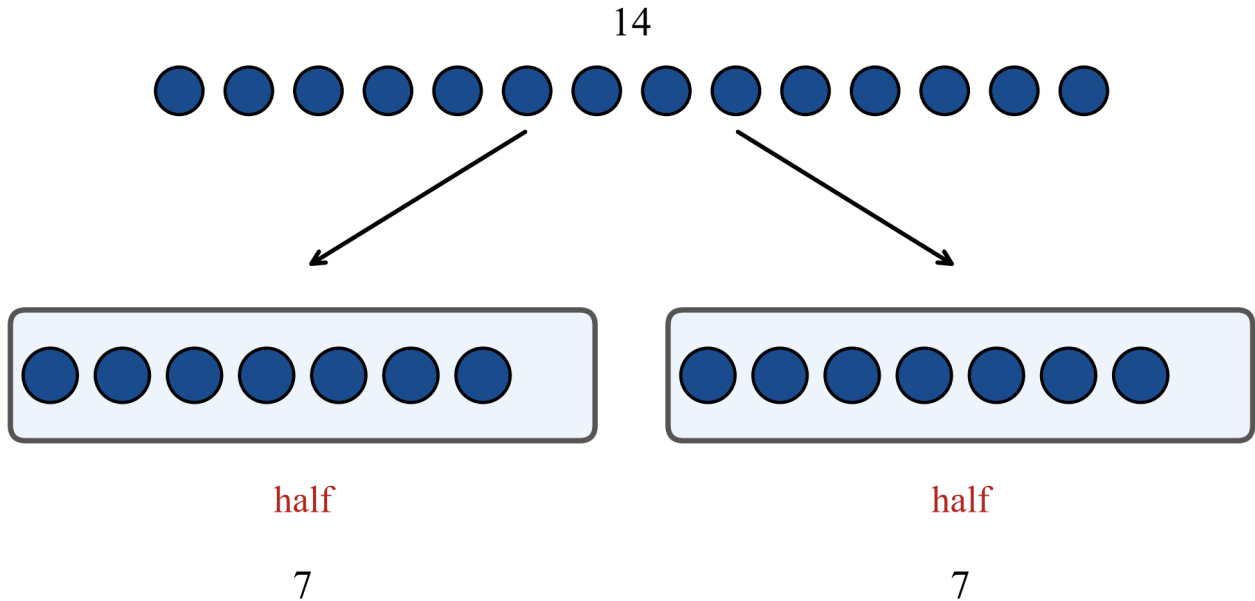
Words that go together

Double, twice and $\times 2$ all mean the same thing.

Double 7 is $7 + 7$. Twice 7 is $7 + 7$. 2×7 is $7 + 7$. They are all 14.

Halve and $\div 2$ mean the same thing.

Halve 14: put 14 into 2 equal groups. Each group has 7. So half of 14 is 7, and $14 \div 2 = 7$.



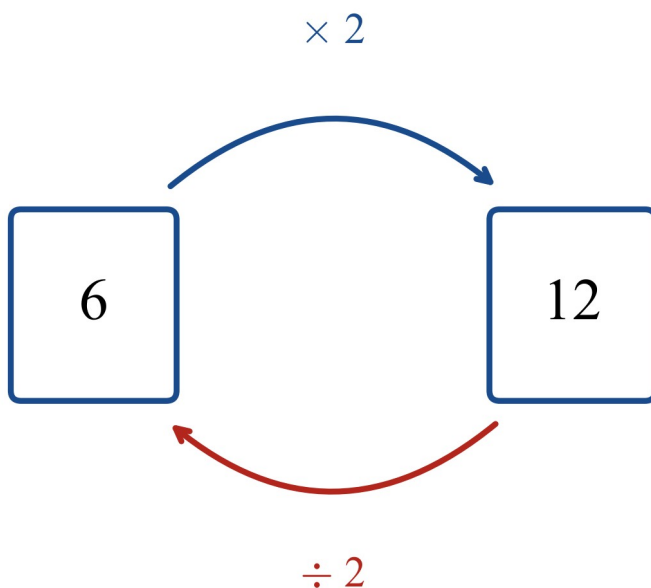
14 counters shared into 2 equal groups. Each group has 7, so each group is half.

Doubles and halves go together

Doubling and halving use the same facts.

$$2 \times 6 = 12, \text{ so } 12 \div 2 = 6$$

If you know double 6 is 12, you know half of 12 is 6. You can get the division fact from the double.



Doubling 6 gives 12. Halving 12 gives 6.

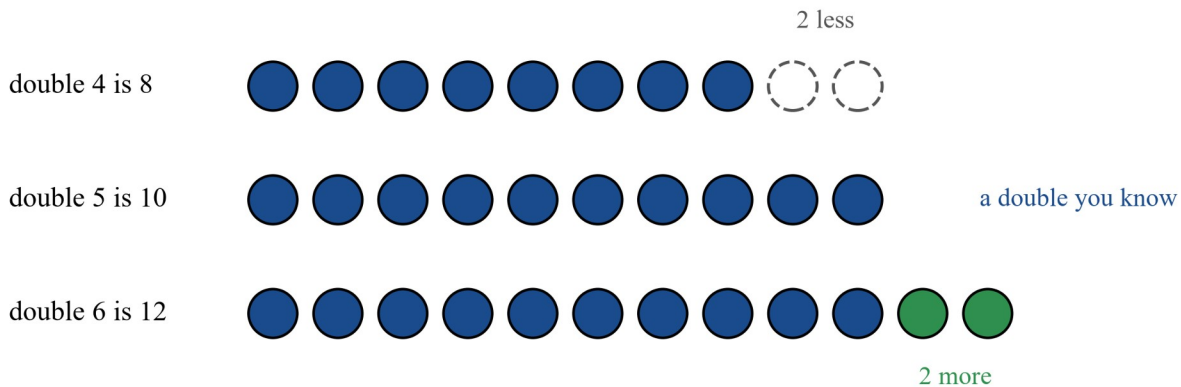
A double you know helps you

You know that double 5 is 10.

Double 6 is 2 more than double 5. So double 6 is 12.

Double 4 is 2 less than double 5. So double 4 is 8.

Use doubles you know to find new doubles.



Double 4 is 8, that is 2 less than double 5. Double 6 is 12, that is 2 more than double 5.

Games help you

Games with dice help you get to know the 2 facts fast. Fast means you just know them, with no counting.

We try together

Do these with your teacher. Use things to touch, or look at the dots here.

We try 1 — double it, then halve it

Make 2×7 with counters. Then find the division fact that goes with it.

Working	Note
Make 2 groups. Put 7 counters in each group.	2 groups of 7.
Count all the counters: $7 + 7 = 14$. So $2 \times 7 = 14$.	Double 7 is 14.
Turn it around: $7 \times 2 = 14$.	7 groups of 2 is 14 too.
Share the 14 counters into 2 equal groups.	Each group has 7.
So $14 \div 2 = 7$.	Halving uses the same fact as doubling.

●●●●●●●●●●●●●●●●

2 groups of 7 make 14.

$\therefore 2 \times 7 = 14$, and $14 \div 2 = 7$.

We try 2 — use a double you know

Double 6. Use double 5 to help you.

Working	Note
Make double 5 with cubes: 5 and 5. $5 + 5 = 10$.	Double 5 is 10.
Double 6 has 1 more cube in each row. That is 2 more	$10 + 2 = 12$.

altogether.

So double 6 is 12.

$$2 \times 6 = 12.$$

Double 4 is 2 less than double 5. $10 - 2 = 8$.

Double 4 is 8.

Check with halving: $12 \div 2 = 6$. ✓

The half of 12 is 6.

Double 5: ●●●●● and ●●●●● → 10 Double 6: ●●●●●● and ●●●●●● → 12

∴ Double 6 is 12, and double 4 is 8.

Questions to practise

With help

Q1. Count by 2. Fill in the missing numbers.

2, 4, □, □, 10, □, 14, □, 18, □

Q2. Double it.

- a. double 2 = □
- b. double 3 = □
- c. double 5 = □
- d. double 8 = □
- e. double 10 = □

Q3. Halve it.

- a. half of 4 = □
- b. half of 10 = □
- c. half of 14 = □
- d. half of 18 = □
- e. half of 20 = □

Q4. The facts go together. Fill in the missing numbers.

- a. $2 \times 4 = 8$, so $8 \div 2 = \square$
- b. $2 \times 9 = 18$, so $18 \div 2 = \square$

Q5. Use double 5.

- a. Double 5 = 10, so double 6 = $10 + \square = \square$
- b. Double 5 = 10, so double 4 = $10 - \square = \square$

Q6. Use a hundreds chart.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

A hundreds chart from 1 to 100. The doubles 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 are coloured.

- Colour the doubles on the chart: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.
- Look at your chart. Double 9 is .
- Which number makes 16 when you double it? .

On your own

Q7. The 2 facts.

- $2 \times 3 = \square$
- $2 \times 8 = \square$
- $6 \times 2 = \square$
- $9 \times 2 = \square$
- $2 \times 10 = \square$
- $2 \times 1 = \square$

Q8. Turn the fact around. For 8 twos, think 2 eights.

- $3 \times 2 = 6$, so $2 \times 3 = \square$
- $5 \times 2 = 10$, so $2 \times 5 = \square$

- c. $7 \times 2 = 14$, so $2 \times 7 = \square$
- d. $10 \times 2 = 20$, so $2 \times 10 = \square$

Q9. Halve it.

- a. $12 \div 2 = \square$
- b. $16 \div 2 = \square$
- c. $20 \div 2 = \square$
- d. $6 \div 2 = \square$
- e. $18 \div 2 = \square$
- f. $2 \div 2 = \square$

Q10. Write the division fact that goes with the double.

- a. $2 \times 7 = 14$, so $14 \div 2 = \square$
- b. $2 \times 5 = 10$, so $\square \div \square = \square$
- c. $2 \times 8 = 16$, so $\square \div \square = \square$

Q11. Double these numbers.

- a. double 7 = $\square$
- b. double 9 = $\square$
- c. double 3 = $\square$
- d. double 10 = $\square$
- e. double 6 = $\square$

Q12. Halve these numbers.

- a. half of 8 = $\square$
- b. half of 12 = $\square$
- c. half of 20 = $\square$
- d. half of 2 = $\square$
- e. half of 14 = $\square$

Q13. Use a double you know.

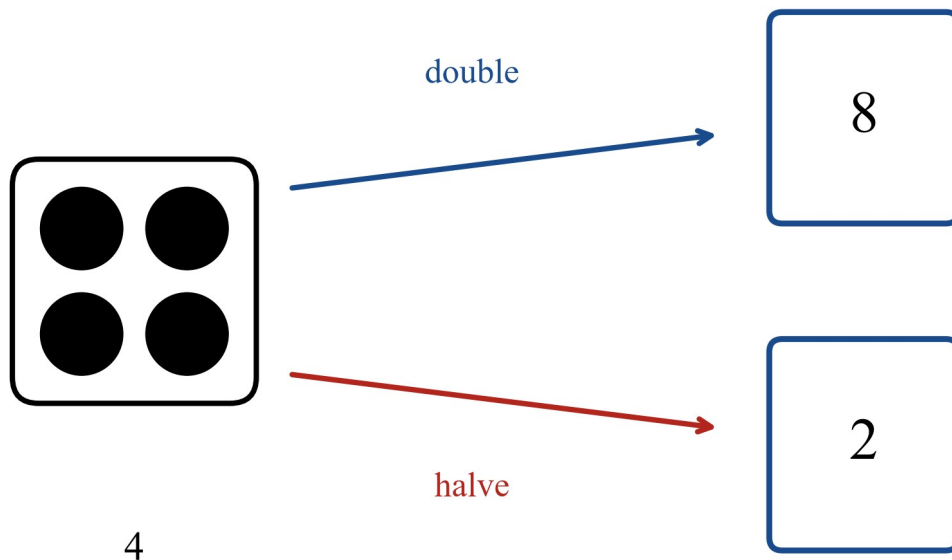
- a. Double 6 = $\square$ (think double 5)
- b. Double 4 = $\square$ (think double 5)
- c. Double 9 = $\square$ (think double 10)

Q14. Play “Double or halve” with a partner.

Things you need: a dice, paper, a pencil.

How to play:

1. Your target is 20. Write 0 as your first total.
2. On your turn, roll the dice. Look at the number on top.
3. If it is 2, 4 or 6, you can double it or halve it. If it is 1, 3 or 5, you must double it.
4. Add your number to your total.
5. Take turns. The first player to reach 20 or more wins.



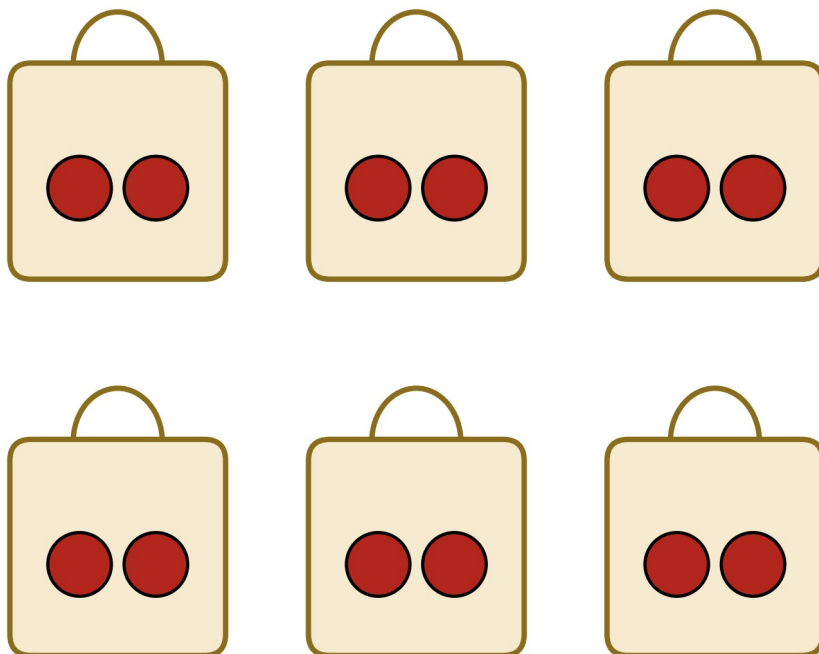
A dice shows 4. Double 4 is 8. Halve 4 is 2.

Maths in real life

Q15. Market day

Queen Victoria Market is a real market in Melbourne. Mia helps a seller pack bags of apples. Each bag has 2 apples.

Source: Queen Victoria Market, qvm.com.au, retrieved 2026-08-19.



Six bags. Each bag has 2 apples.

- Mia packs 6 bags. How many apples is that altogether? Write the number sentence.
- Mia has 18 apples. She puts 2 apples in each bag. How many bags does she fill? Write the number sentence.
- Mia packs 5 bags in the morning. In the afternoon, she packs twice as many. How many bags does she pack in the afternoon? How many apples is that?

Answers

Q1. 6, 8, 12, 16, 20.

Q2. a. 4 b. 6 c. 10 d. 16 e. 20.

Q3. a. 2 b. 5 c. 7 d. 9 e. 10.

Q4. a. 4 b. 9.

Q5. a. 2, 12 b. 2, 8.

Q6. b. 18 c. 8.

Q7. a. 6 b. 16 c. 12 d. 18 e. 20 f. 2.

Q8. a. 6 b. 10 c. 14 d. 20.

Q9. a. 6 b. 8 c. 10 d. 3 e. 9 f. 1.

Q10. a. $14 \div 2 = 7$ b. $10 \div 2 = 5$ c. $16 \div 2 = 8$.

Q11. a. 14 b. 18 c. 6 d. 20 e. 12.

Q12. a. 4 b. 6 c. 10 d. 1 e. 7.

Q13. a. 12 b. 8 c. 18.

Q14. Game. Check each turn: the number on the dice is doubled or halved, and the total goes up.

Q15. a. 12 apples; $2 \times 6 = 12$. b. 9 bags; $18 \div 2 = 9$. c. 10 bags, double 5 = 10; 20 apples, $10 \times 2 = 20$.

All the working

Q1. Count by 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. The missing numbers are 6, 8, 12, 16 and 20.

$\therefore$ 6, 8, 12, 16, 20.

Q2. Double each number: $2 + 2 = 4$, $3 + 3 = 6$, $5 + 5 = 10$, $8 + 8 = 16$, $10 + 10 = 20$.

$\therefore$ a. 4 b. 6 c. 10 d. 16 e. 20.

Q3. Halve each number: $4 \div 2 = 2$, $10 \div 2 = 5$, $14 \div 2 = 7$, $18 \div 2 = 9$, $20 \div 2 = 10$.

$\therefore$ a. 2 b. 5 c. 7 d. 9 e. 10.

Q4. a. $2 \times 4 = 8$. The division fact uses the same numbers: $8 \div 2 = 4$. b. $2 \times 9 = 18$. The division fact is $18 \div 2 = 9$.

$\therefore$ a. 4 b. 9.

Q5. a. Double 6 is 2 more than double 5: $10 + 2 = 12$. b. Double 4 is 2 less than double 5: $10 - 2 = 8$.

$\therefore$ a. 2, 12 b. 2, 8.

Q6. a. The doubles 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 are coloured. b. Count by 2 to 9: double 9 is 18. c. $8 + 8 = 16$, so 8 makes 16 when you double it. Half of 16 is 8.

$\therefore$ b. 18 c. 8.

Q7. The 2 facts: $2 \times 3 = 6$, $2 \times 8 = 16$, $6 \times 2 = 12$, $9 \times 2 = 18$, $2 \times 10 = 20$, $2 \times 1 = 2$.

$\therefore$ a. 6 b. 16 c. 12 d. 18 e. 20 f. 2.

Q8. Turn each fact around: $3 \times 2 = 6$ gives $2 \times 3 = 6$; $5 \times 2 = 10$ gives $2 \times 5 = 10$; $7 \times 2 = 14$ gives $2 \times 7 = 14$; $10 \times 2 = 20$ gives $2 \times 10 = 20$.

∴ a. 6 b. 10 c. 14 d. 20.

Q9. Halve each number: $12 \div 2 = 6$, $16 \div 2 = 8$, $20 \div 2 = 10$, $6 \div 2 = 3$, $18 \div 2 = 9$, $2 \div 2 = 1$.

∴ a. 6 b. 8 c. 10 d. 3 e. 9 f. 1.

Q10. a. $2 \times 7 = 14$, so $14 \div 2 = 7$. b. $2 \times 5 = 10$, so $10 \div 2 = 5$. c. $2 \times 8 = 16$, so $16 \div 2 = 8$.

∴ a. $14 \div 2 = 7$ b. $10 \div 2 = 5$ c. $16 \div 2 = 8$.

Q11. Double each number: $7 + 7 = 14$, $9 + 9 = 18$, $3 + 3 = 6$, $10 + 10 = 20$, $6 + 6 = 12$.

∴ a. 14 b. 18 c. 6 d. 20 e. 12.

Q12. Halve each number: $8 \div 2 = 4$, $12 \div 2 = 6$, $20 \div 2 = 10$, $2 \div 2 = 1$, $14 \div 2 = 7$.

∴ a. 4 b. 6 c. 10 d. 1 e. 7.

Q13. a. Double 5 is 10. Double 6 is 2 more: 12. b. Double 5 is 10. Double 4 is 2 less: 8. c. Double 10 is 20. Double 9 is 2 less: 18.

∴ a. 12 b. 8 c. 18.

Q14. This is a game. On each turn, the number on the dice is doubled or halved, and the new number is added to the total. Check that each total goes up by the doubled or halved number.

Q15. a. 6 bags with 2 apples in each: $2 \times 6 = 12$. b. 18 apples, 2 in each bag: $18 \div 2 = 9$. c. Twice as many as 5 bags is double 5: 10 bags. 10 bags with 2 apples in each: $10 \times 2 = 20$.

∴ a. 12 apples b. 9 bags c. 10 bags and 20 apples.

What comes next

Next year you will learn the multiplication facts for 3, 4, 5 and 10 (VC2M3A03), and how to find missing numbers (VC2M3A01).

Test

Mathematics 2 — Chapter 2 check: Algebra

Take your time. Read each question with your teacher, and show your working.

Marks: 20

Time: There is no timer. Guidance for teachers: about 20 minutes.

Things you can use: counters, cubes, a 10-frame, a number line, a hundreds chart, pencils and paper. Materials are supplied for you.

No calculators. Your teacher may read any question to you.

Q1. Circle the letter of the right answer. [4 marks]

a. Look at this pattern:

5, 9, 13, □, 21

What is the missing number? [1 mark]

A	B	C	D
15	16	17	18

b. Here are 3 groups of 4 counters.

●●●● ●●●● ●●●●

Which number sentence shows the same number added again and again? [1 mark]

A	B	C	D
$3 + 4 = 7$	$4 + 4 + 4 = 12$	$4 + 3 + 3 = 10$	$3 + 3 + 3 + 3 = 12$

c. What is $7 + 8$? [1 mark]

A	B	C	D
15	14	16	13

d. What is double 7? [1 mark]

A	B	C	D
12	16	9	14

Q2. Patterns. [4 marks]

a. Look at this pattern:

6, 10, 14, □, □

Write the next 2 numbers. [1 mark]

b. Write the rule.

The rule is: start at □ and add □ each time. [1 mark]

c. Look at this pattern:

18, 15, 12, □, 6

What is the missing number? [1 mark]

d. How do you know? [1 mark]

Q3. The same number, again and again. [4 marks]

- a. Here are 4 groups of 3 counters.

●●● ●●● ●●● ●●●

Write the repeated addition number sentence.

$$\square + \square + \square + \square = \square \text{ [1 mark]}$$

- b. Write the multiplication number sentence for the same groups.

$$\square \times \square = \square \text{ [1 mark]}$$

- c. Start at 12 and take away 3 each time until you get to 0.

$$12 - 3 = 9, 9 - 3 = 6, 6 - 3 = 3, 3 - 3 = 0$$

How many times did you take away 3? **[1 mark]**

- d. Write the division number sentence.

$$\square \div \square = \square \text{ [1 mark]}$$

Q4. Facts to 20. [4 marks]

- a. Add. **[1 mark]**

$$8 + 7 = \square$$

$$9 + 6 = \square$$

$$7 + 7 = \square$$

- b. The parts are 8 and 7. The whole is 15. Write the 2 subtraction facts that go with $8 + 7 = 15$. **[1 mark]**

- c. Find the missing numbers. **[1 mark]**

$$9 + \square = 16$$

$$15 - \square = 6$$

- d. How did you work out $9 + 6$? Tell the helper you used (a double, a near double, make 10, or count on). **[1 mark]**

Q5. Doubles and halves. [4 marks]

- a. Double it. **[1 mark]**

$$\text{double } 6 = \square$$

$$\text{double } 9 = \square$$

- b. Halve it. **[1 mark]**

$$\text{half of } 12 = \square$$

$$\text{half of } 18 = \square$$

- c. The facts go together. Fill in the missing numbers. **[1 mark]**

$$2 \times 8 = 16, \text{ so } \square \div \square = \square$$

- d. Australian football. Each game has 4 quarters. Mia's team plays 2 games. How many quarters is that altogether? Write the number sentence. **[1 mark]**

Source: AFL, Laws of the Game, afl.com.au, retrieved 2026-08-19.

Solutions

Marking guide

Administration (per TOC §7). This is a classroom check, not an exam. It is untimed; the guidance duration for a teacher planning a lesson is 20 minutes. Materials are supplied (counters, cubes, a 10-frame, a number line, a hundreds chart, pencils and paper). **No calculators** (D27). Any item may be read aloud by the teacher.

Marks by item and CD. Only Chapter 2 CDs are assessed (§4); every Chapter 2 CD contributes at least one separately scored item.

Item	CD code	Subtopic	Type	Marks
Q1a	VC2M2A01	2A	MCQ (A–D)	1
Q1b	VC2M2A04	2B	MCQ (A–D)	1
Q1c	VC2M2A02	2C	MCQ (A–D)	1
Q1d	VC2M2A03	2D	MCQ (A–D)	1
Q2	VC2M2A01	2A	Short answer / worked response	4
Q3	VC2M2A04	2B	Worked response	4
Q4	VC2M2A02	2C	Short answer / worked response	4
Q5	VC2M2A03	2D	Short answer / worked response	4
Total				20

MCQ total: 4 of 20 marks — no more than one quarter of the marks, per §7.

Rubrics, by CD. The achievement-standard extract for each CD is quoted verbatim from `maths_2.json`; rubrics score the strategy as well as the answer (§7).

VC2M2A01 (2A) — 5 marks (Q1a 1, Q2 4). “*Students describe and continue patterns that increase and decrease additively by a constant amount and identify missing elements in the pattern.*” Observable actions:

- continues an increasing pattern by a constant amount — writes 18, 22 (1 mark); describes the rule with the constant amount — start at 6 and add 4 each time (1 mark);
- identifies the missing element in a decreasing pattern — 9 (1 mark); justifies by stating or showing the constant amount taken away — $12 - 3 = 9$ and $9 - 3 = 6$ (1 mark);
- identifies the missing element in a multiple-choice pattern — C, 17 (1 mark).

VC2M2A04 (2B) — 5 marks (Q1b 1, Q3 4). The extract carried on this CD in `maths_2.json` is “*Students describe and continue patterns that increase and decrease additively by a constant amount and identify missing elements in the pattern.*” Repeated constant addition and subtraction are that structure applied to operations, which is what these items observe. Observable actions:

- selects the repeated addition that matches equal groups — B, $4 + 4 + 4 = 12$ (1 mark);
- writes the repeated addition for 4 groups of 3 — $3 + 3 + 3 + 3 = 12$ (1 mark);
- writes the short multiplication — $4 \times 3 = 12$ (1 mark);
- counts how many times the same number is taken away to reach 0 — 4 times (1 mark);
- writes the short division — $12 \div 3 = 4$ (1 mark).

VC2M2A02 (2C) — 5 marks (Q1c 1, Q4 4). “*They recall and demonstrate proficiency with addition and subtraction facts within 20 and multiplication facts for twos.*” Observable actions:

- recalls addition facts to 20 — 15, 15, 14 (1 mark);
- writes both related subtraction facts — $15 - 7 = 8$ and $15 - 8 = 7$, either order (1 mark);
- finds the missing numbers from related facts — 7 and 9 (1 mark);
- names a helper and explains it for $9 + 6$ — for example, make 10: $9 + 1 = 10$, $10 + 5 = 15$ (1 mark). The strategy is scored as well as the answer (§7): the answer 15 in Q4a earns its own mark; this mark is for the stated strategy.
- recalls a fact to 20 in multiple-choice form — A, 15 (1 mark).

VC2M2A03 (2D) — 5 marks (Q1d 1, Q5 4). *“They recall and demonstrate proficiency with addition and subtraction facts within 20 and multiplication facts for twos.”* Observable actions:

- recalls doubles within 20 — 12, 18 (1 mark);
- recalls halves of numbers within 20 — 6, 9 (1 mark);
- gives the related division fact from a two-fact — $16 \div 2 = 8$ (1 mark);
- applies a two-fact in a real context and writes the number sentence — 8 quarters; $2 \times 4 = 8$ (1 mark);
- recalls a double in multiple-choice form — D, 14 (1 mark).

MCQ key. Q1a C · Q1b B · Q1c A · Q1d D. One mark per correct letter; no part marks.

General marking notes.

- Number sentences must be written horizontally and be complete (with = and the answer) to earn the mark. A column algorithm set out vertically is out of scope at Level 2 (D18) and is not rewarded.
- Q2d and Q4d score the explanation, not the answer. Accept any correct strategy the student can state or show; for $9 + 6$, make 10 and count on fit best, and a correct use of a double (for example, double 6 is 12, then $12 + 3 = 15$) is also accepted.
- Q4b: both subtraction facts are needed for the mark; either order is accepted.
- Q5d: accept $2 \times 4 = 8$ or $4 + 4 = 8$ with the answer 8 quarters.
- Unknowns are shown with $\square$, never a letter (no pronumerals at Level 2).

Answers

Q1. a. C b. B c. A d. D.

Q2. a. 18, 22 b. start at 6 and add 4 each time c. 9 d. The pattern goes down by 3 each time: $12 - 3 = 9$, and $9 - 3 = 6$.

Q3. a. $3 + 3 + 3 + 3 = 12$ b. $4 \times 3 = 12$ c. 4 d. $12 \div 3 = 4$.

Q4. a. 15, 15, 14 b. $15 - 7 = 8$ and $15 - 8 = 7$ c. 7, 9 d. Example: make 10 — $9 + 1 = 10$, then $10 + 5 = 15$.

Q5. a. 12, 18 b. 6, 9 c. $16 \div 2 = 8$ d. 8 quarters; $2 \times 4 = 8$.

All the working

Q1. a. From 5 to 9 is add 4, and from 9 to 13 is add 4. The rule is add 4 each time: $13 + 4 = 17$. Check: $17 + 4 = 21$. ✓
∴ C.

b. 3 groups of 4 means 4 is added 3 times: $4 + 4 + 4 = 12$. Option D is 4 groups of 3, not 3 groups of 4. ∴ B.

c. Double 7 is 14, and $7 + 8$ is 1 more than $7 + 7$: $14 + 1 = 15$. ∴ A.

d. Double 7 is $7 + 7 = 14$. ∴ D.

Q2. a–b. From 6 to 10 is add 4, and from 10 to 14 is add 4. The rule is start at 6 and add 4 each time. Keep going: $14 + 4 = 18$ and $18 + 4 = 22$.

c–d. From 18 to 15 is take away 3, and from 15 to 12 is take away 3. The rule is take away 3 each time. The missing number is $12 - 3 = 9$. Check: $9 - 3 = 6$. ✓

∴ a. 18, 22 b. start at 6 and add 4 each time c. 9 d. the numbers go down by 3 each time: $12 - 3 = 9$, and $9 - 3 = 6$.

Q3. a. 4 groups of 3: add 3 four times: $3 + 3 + 3 + 3 = 12$. b. The short way to write 4 groups of 3 is $4 \times 3 = 12$.

c. Take away 3 each time until 0: $12 - 3 = 9$, $9 - 3 = 6$, $6 - 3 = 3$, $3 - 3 = 0$. That is 4 times. d. Division is repeated subtraction: $12 \div 3 = 4$.

∴ a. $3 + 3 + 3 + 3 = 12$ b. $4 \times 3 = 12$ c. 4 d. $12 \div 3 = 4$.

Q4. a. The facts to 20: $8 + 7 = 15$, $9 + 6 = 15$, $7 + 7 = 14$. b. The parts are 8 and 7 and the whole is 15, so the facts turn around: $15 - 7 = 8$ and $15 - 8 = 7$. c. $9 + 7 = 16$, so the missing number is 7. $15 - 9 = 6$, so the missing number is 9.

d. One helper: make 10. The 9 needs 1 to make 10. Split 6 into 1 and 5. $9 + 1 = 10$, and $10 + 5 = 15$. Count on also works: start at 9 and count on 6 — 10, 11, 12, 13, 14, 15.

∴ a. 15, 15, 14 b. $15 - 7 = 8$ and $15 - 8 = 7$ c. 7, 9 d. make 10: $9 + 1 = 10$, $10 + 5 = 15$.

Q5. a. Double 6 is $6 + 6 = 12$. Double 9 is $9 + 9 = 18$. b. Half of 12: $12 \div 2 = 6$. Half of 18: $18 \div 2 = 9$. c. $2 \times 8 = 16$, so the division fact uses the same numbers: $16 \div 2 = 8$. d. Each game has 4 quarters. 2 games is 2 groups of 4: $4 + 4 = 8$, and the short way is $2 \times 4 = 8$. That is 8 quarters altogether.

∴ a. 12, 18 b. 6, 9 c. $16 \div 2 = 8$ d. 8 quarters; $2 \times 4 = 8$.